ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECTS

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PROJECT: Regional Research Project S-009

Plant Genetic Resources Conservation and Utilization

COOPERATING AGENCIES AND PRINCIPAL LEADERS:

State Agricultural Experiment Station Representatives

AL	J.A. Mosjidis*	NC	H.T. Stalker* (Secretary)
AR	T.E. Morelock*	OK	J.S. Kirby*
FL	K.H. Quesenberry*	PR	L. Viles*
GA	W.D. Branch*	SC	B.B. Rhodes* (Chair)
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National Genetic Resources Program, ARS	P.K. Bretting
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National Seed Storage Lab, ARS	S.A. Eberhart
NCGR-Subtropical Horticultural, ARS	R.J. Schnell
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Plant Genetic Resources Conservation Unit
Cooperative ARS and SAES

Regional Coordinator	S. Kresovich
Research Plant Pathologist	A.G. Gillaspie, Jr.
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Curator, Agronomist	G.R. Lovell
Curator, Agronomist	J.B. Morris
Curator, Agronomist	R.N. Pittman

* Indicates voting member of the Technical Committee

PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS:

Genetic resources representing 488 new accessions were received, increasing the Unit holdings to in excess of 79,000. New introductions represented a broad range of seven families, forty genera, and sixty-seven species. More than 4,500 regenerations were accomplished at Griffin or through cooperators across various sites. In response to 810 requests, 37,265 items (corms, in-vitro, plants, rhizomes, and seed) were distributed with 92% being supplied to domestic users. Twenty oligomers were distributed as molecular markers to profile ('type') accessions and map useful characteristics. In complement more than 152,400 records were created and more than 140,700 records were modified to enhance the Germplasm Resources Information Network (GRIN) database. To support appropriate backup, 13,077 accessions representing 23 families, 64 genera, and 262 species were processed and shipped to the National Seed Storage Laboratory.

In collaboration with crop experts, evaluation studies were conducted on morphological and agronomic/horticultural traits in forage legumes, cucurbits, watermelon, peanuts, cowpeas, oil crops, grasses, sorghum, okra, and eggplant. Associated characterizations were conducted in all regenerations by all curators.

Various genetic analysis techniques (PCR-based), *i.e.*, RFLPs, RAPDs, AFLPs, and SSRs, are being applied to establish genetic identity, relatedness, and structure of accessions held in *ex situ* plant genetic resources repositories in the U.S. (work focused on holdings from Griffin, Mayaguez, Ames, Miami, and Geneva). Based on our experiences to date, we have improved efficiency, simplified protocols, increased the level of automation, and decreased the unit costs of each assay. This genetic analysis is conducted in collaboration with Pioneer Hi-Bred International, Perkin-Elmer, AgraTech Seeds, and Linkage Genetics.

Significant infrastructure improvements were achieved during 1997. The renovation and installation of a self-contained walk-in dual compartment cold storage unit was completed in the Seed Storage Building. Installation of the local area network was completed connecting seven buildings through fiber optic cable. It is a fifty-user network giving the entire Unit access to the Internet, email, and the GRIN. A backup generator was purchased to run all cold storage rooms in the event of a power failure.

USEFULNESS OF FINDINGS:

Results obtained via collaborative efforts among scientists at the regional repository, federal laboratories, state agricultural experiment stations, and industry are mutually beneficial as sources of information and products for all. Through the efforts at the repository, broad genetic representation of crop plants and their weedy/wild relatives is maintained for ready access. Cooperators identifying desirable traits among accessions aid in crop improvement efforts to produce a higher quality product more efficiently and in an environmentally safe manner. Information gained from cropping system studies of potential new crops may lead to greater diversification of agriculture in the southeastern United States.

STATEMENT OF ACCOMPLISHMENTS

Over the past four years, more than 122,000 seed packets, cuttings, tissue culture, corms, and rhizomes were distributed to public- and private-sector scientists. Eighty-five percent of the distributions were made to researchers in the U.S. These requested and evaluated genetic resources included traits used for incorporating disease resistance, insect resistance, and quality factors to recently released lines of sorghum, peanut, watermelon, cowpea, grasses, and pepper among other commodities. Documentation of these desirable traits and other related characters can be accessed through the GRIN (Germplasm Resources Information Network).

WORK PLANNED FOR NEXT YEAR:

Continued emphasis will be placed on regeneration, backup, and documentation efforts. Molecular marker development research will focus on applications in the sorghum, peanut, sweetpotato, and vegetable crops collections. Pathology research will center on characterization and assay development for viruses of legumes.

PUBLICATIONS:

See attachment.

APPROVED:

/s/ Billy B. Rhodes	3/9/98
Chair, Technical Committee	Date
/s/ G. F. Arkin	3/10/98
Administrative Advisor	Date

PUBLICATIONS

Alabama

Mosjidis, J.A. 1997. Kummerowia. pp. 167-170. In: Faridah Hanum, I., and L.J.G. van der Maesen (eds.) Plant Resources of South-East Asia No. 11, Auxiliary plants. Backhuys Publishers, Leiden, The Netherlands. 389 pp.

Mosjidis, J.A. 1997. Lespedeza cuneata. pp. 170-173. In: Faridah Hanum, I., and L.J.G. van der Maesen (eds.) Plant Resources of South-East Asia No. 11, Auxiliary plants. Backhuys Publishers, Leiden, The Netherlands. 389 pp.

Mosjidis, J.A and K. Klingler. 1997. Evaluation of common vetch for cyanogenesis. Agronomy Abstracts. p. 155.

Xie, C. and J.A. Mosjidis. 1997. Influence of sample size on precision of heritability and expected selection response in red clover. Plant Breeding 116:83-88.

Arkansas

No publications submitted.

Florida

No publications submitted.

Georgia

No publications submitted.

Hawaii

No publications submitted.

Kentucky

No publications submitted.

Louisiana

Rolston, L.H., D.R. La Bonte, W.A. Mulkey, C.A. Clark, J.M. Cannon, and P.W. Wilson. 'Darby' sweetpotato. HortScience. 30:398-399.

Rolston, L.H., D.R. La Bonte, W.A. Mulkey, C.A. Clark, J.M. Cannon, and P.W. Wilson. Sweetpotato Germplasm. HortScience 29:712.

Mississippi

Robinson, M. R., J. N. Jenkins, and J. C. McCarty, Jr. 1997. Different sources of root-knot nematode resistance. p.444. In P. Dugger and D. A. Richter (ed.), Proc. Beltwide Cotton Conf., New Orleans, LA. 6-10 Jan. 1997. National Cotton Council, Memphis, TN.

Creech, J. B., J. N. Jenkins, and J. C. McCarty, Jr. 1997. Genetics of photoperiodism in *Gossypium* race stocks. p.447. In P. Dugger and D. A. Richter (ed.), Proc. Beltwide Cotton Conf., New Orleans, LA. 6-10 Jan. 1997. National Cotton Council, Memphis, TN.

Robinson, M. R., J. N. Jenkins, and J. C. McCarty, Jr. 1997. Root-knot nematode resistance of F2 cotton hybrids from crosses of resistant germplasm and commercial cultivars. Crop Sci. 37:1041-1046.

Nelson, L. R., T. D. Phillips, and C. E. Watson. 1997. Plant breeding for improved production in annual ryegrass. p.1-14. *In* F. M. Roquette and L. R. Nelson (ed.) Ecology, Production, and Management of *Lolium* for forage in the USA. CSSA Spec. Publ. 24. Crop Science Society of America, Madison, WI.

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Gourley, L. M., C. E. Watson, R. E. Schaffert, and W. A. Payne. 1997. Genetic resistance to soil chemical toxicities and deficiencies. p.461-480. In E. A. Banset (ed.) Genetic Improvement of Sorghum and Pearl Millet. INTSORMIL Publication No. 97-5, University of Nebraska, Lincoln, NE.

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Hartwig, E. E., T. M. Kuo, and M. M. Kenty. 1997. Seed protein and its relationship to soluble sugars in soybean. Crop Sci. 37:770-773.

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Gourley, L. M., C. E. Watson, and J. D. Axtell. 1997. Grain sorghum inbreds tolerant to tropical soils released as germplasm. Inter. Sorghum Millets Newslett. (IN PRESS)

North Carolina

No publications.

Oklahoma

Porter, D. R., Burd, J. D., Shufran, K. A., Webster, J. A. and Teetes, G. L. 1997. Greenbug (Homoptera: Aphididae) biotypes: Selected by resistant cultivars or preadapted opportunists? J. Econ. Entomol. 90:1055-1065.

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Puerto Rico

No publications submitted.

South Carolina

No publications submitted.

Tennessee

No publications submitted.

Texas

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Dahlberg, J.A., D.T. Rosenow, G.C. Peterson, L.E. Clark, F.R. Miller, A. Soto-mayor-Rios, A.J. Hamburger, P. Madera-Torres, A. Quiles-Belen, and C.A. Woodfin. 1997. Release of 40 converted sorghum lines from the World Sorghum Collection. International Sorghum and Millet Newsletter. ISMN No. 37. p. 53-56.

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Rosenow, D.T., J.A. Dahlberg, G.C. Peterson, L.E. Clark, F.R. Miller, A. Sotomayor-Rios, A. Quiles-Belen, P. Madera, and C.A. Woodfin. 1997. Registration of 50 converted sorghums from the sorghum conversion program. Crop Sci. 37:1397-1398.

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Toure, A., K. Traore, A. Bengaly, J.F. Scheuring, D.T. Rosenow, and L.W. Rooney. 1997. The potential of local cultivars in sorghum improvement in Mali. African Crop Sci. J. (Accepted).

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Vielle-Calzada, J.P., M.L. Nuccio, M.A. Budiman, T.L. Thomas, B.L. Burson, M.A. Hussey and R.A. Wing. 1996. Comparative gene expression in sexual and apomictic ovaries of *Pennisetum ciliare (L.)* Link. Plant Molecular Biology 32: 1085-1092.

Wang, Y.W., M.A. Hussey, R. Ming, B.L. Burson and A.H. Paterson. 1997. Comparative alignment of a buffelgrass linkage map with grain crops. Agronomy Abstracts, p.84.

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Wiltse, C.C., W.L. Rooney, R.A. Frederiksen, and D.T. Rosenow. 1997. Survey of anthracnose resistant sorghum germplasm lines to identify additional resistance genes. Agronomy Abstacts. p.72.

Virginia

No publications submitted.

USDA-Plant Genetic Resources Conservation Unit

Brown, S.M., S.E. Mitchell, C.A. Jester, Z.W. Liu, S. Kresovich, and R.R. Duncan. 1997. DNA typing (profiling) of seashore paspalum (*Paspalum vaginatum* Swartz) ecotypes and cultivars. In: *Turfgrass Biotechnology,* (M.B. Sticklen and M.P. Kenna, eds.), pp. 39-51. Ann Arbor Press, Chelsea.

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Phippen, W.B., S. Kresovich, F. Gonzalez-Candelas, and J.R. McFerson. 1997. Molecular characterization can discriminate and partition variation among genebank holdings: a case study with phenotypically similar accessions of *Brassica oleracea* L. var. *capitata* (cabbage) 'Golden Acre'. Theor. Appl. Genet. 94:227-234.

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Westman, A.L. and S. Kresovich. 1997. Use of molecular markers for description of plant genetic variation. In: *Plant Genetic Resources Conservation and Use*, (J. Callow *et al*., eds.), pp. 9-48. CAB International, London.